U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON ENERGY AND COMMERCE

April 29, 2019

TO: Republican Members, Committee on Energy and Commerce

FROM: Committee Minority Staff

RE: Hearing entitled "DOE's Mounting Cleanup Costs: Billions in Environmental Liability and Growing."

The Subcommittee on Oversight and Investigations will hold a hearing on Wednesday, May 1, 2019, at 10:30 a.m. in 2322 Rayburn House Office Building entitled "DOE's Mounting Cleanup Costs: Billions in Environmental Liability and Growing." The hearing will examine the Department of Energy's (DOE) management of its environmental cleanup program, led by the Office of Environmental Management.

I. WITNESSES

- The Honorable Anne White, Assistant Secretary for the Office of Environmental Management, U.S. Department of Energy; and
- Mr. David Trimble, Director, Natural Resources and Environment, U.S. Government Accountability Office.

II. BACKGROUND

A. U.S. Department of Energy's Office of Environmental Management

The U.S. Department of Energy's (DOE) Office of Environmental Management (EM) was created in 1989 to cleanup the radioactive legacy of the Cold War.[1] From 1989 to 1994 EM's "focus was on identification, characterization, and then actions taken to address the most urgent risks of the environmental contamination from the Manhattan Project and Cold War weapons production and research activities."[2] From 1995 to 1999, EM's focus shifted "to active cleanup."[3] Since 2000, EM has "continued to projectize and refine active and long-term cleanup programs to more efficiently and effectively manage accelerated cleanup and closure of sites while continuing to reduce life-cycle costs and shorten site completion schedules."[4]

Today, EM is responsible for completing the safe cleanup of environmental legacy resulting from five decades of nuclear weapons development and government-sponsored nuclear

[1] Evolution and History of the Department of Energy and the Office of Environmental Management, *available at* https://www.energy.gov/sites/prod/files/2014/04/f15/Evolution_History_DOE_042314.pdf.
[2] *Id.*
[3] *Id.*
[4] *Id.*

energy research.[5] EM manages and directs the cleanup of contaminated nuclear weapons manufacturing and testing sites across the United States, which includes the need to safely disposition large volumes of nuclear waste, safeguard and prepare for disposition of nuclear materials that could be used in nuclear weapons, deactivate and decommission several thousand radiologically and chemically contaminated facilities no longer needed to support DOE's mission, and remediate extensive surface and groundwater contamination.[6]

There are two types, or classifications, of radioactive waste—low-level waste and high-level waste. Low-level waste "includes items that have been contaminated with radioactive material or have become radioactive through exposure to neutron radiation. This waste typically consists of contaminated protective shoe covers and clothing, wiping rags, mops, filters, reactor water treatment residues, equipments and tools, luminous dials, medical tubes, swabs, injection needles, syringes, and laboratory animal carcasses and tissues."[7] High-level waste is "the highly radioactive materials produced as a byproduct of the reactions that occur inside nuclear reactors."[8] There are two different forms that high-level waste can take—spent (e.g. used) reactor fuel when it is accepted for disposal, or waste material remaining after spent fuel has been reprocessed (principally for nuclear weapons purposes).[9]

Both low-level waste and high-level waste are treated and conditioned in order to transform the waste into a form that is suitable for safe handling, transportation, storage, and disposal.[10] Liquid low-level waste is typically solidified in cement (e.g. grouting).[11] Cementation uses specially formulated grouts which is a way to immobilize radioactive material that is in various forms of sludges and precipitates/gels (flocks) or activated materials, as well as fragmented solids.[12] Generally, solid low-level waste is placed into containers, the grout is added and allowed to set. Sludges and flocks are placed into a container with a powder form of the grouting mix, the two are mixed together and then left to set.[13]

High-level waste requires the formulation of an insoluble, solid waste form that will remain stable for thousands of years,[14] therefore liquid or wet high-level waste is dried then

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[5] Office of Environmental Management, U.S. Department of Energy, Mission, *available at* https://www.energy.gov/em/mission (last visited on Apr. 19, 2019).
[6] *Id.*
[7] United States Nuclear Regulatory Commission, Low-Level Waste, *available at* https://www.nrc.gov/waste/low-level-waste.html (last visited on Apr. 24, 2019).
[8] *Id.*
[9] *Id.*
[10] World Nuclear Association, Radioactive Waste Management (last updated Apr. 2018), *available at* http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/radioactive-waste-management.aspx (last visited on Apr. 24, 2019).
[11] *Id.*
[12] World Nuclear Association, Treatment and Conditioning of Nuclear Waste (last updated June 2017), *available at* http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/treatment-and-conditioning-of-nuclear-wastes.aspx (last visited on Apr. 24, 2019).
[13] *Id.*
[14] *Id.*

vitrified in a glass matrix (e.g. vitrification).[15] Vitrification has also been used for lower level wastes in certain circumstances.[16] The vitrification process involves the high-level waste being dried to a granular powder which is then incorporated into molten glass, poured into a stainless steel canister, and allowed to cool, forming a solid matrix.[17] Once this process is complete, the container is welded closed and is ready for storage and final disposal.[18]

There are two commonly accepted disposal options—near-surface disposal and deep geological disposal.[19] Near-surface disposal is at the ground level or in caverns below ground level and is suitable for low-level waste.[20] Deep geological disposal is deep disposal in underground repositories in stable geological formations and is suitable for high-level waste.[21]

B. Environmental Liability

Environmental liabilities are the estimated cost to cleanup areas where federal activities have contaminated the environment. To develop its environmental liability estimates, DOE's EM uses the approved life cycle costs for all cleanup projects at each of its sites and adds any adjustments and accounts for any potential cost decreases. According to federal accounting standards, environmental liability estimates only include probable and reasonably estimable costs for cleanup work. Environmental liability costs do not include costs for work for which reasonable estimates cannot be generated. Thus, the U.S. Government Accountability Office (GAO) has advised that because of the federal accounting standards the liability estimates are likely underestimated.[22]

The United States government's environmental liability—$577 billion in Fiscal Year (FY) 2018—is the third highest liability listed in the Financial Report of the United States government. DOE is the driver of most of this liability—$494 billion—given its nuclear cleanup responsibilities, and most of DOE's liability—$377 billion out of the $494 billion—lies with the cleanup costs associated with sites under the responsibility of EM. The DOE's most recent financial statement showed a sharp increase in environmental liability over the last fiscal year of

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[15] World Nuclear Association, Radioactive Waste Management (last updated Apr. 2018), *available at* http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/radioactive-waste-management.aspx (last visited on Apr. 24, 2019).
[16] World Nuclear Association, Treatment and Conditioning of Nuclear Waste (last updated June 2017), *available at* http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/treatment-and-conditioning-of-nuclear-wastes.aspx (last visited on Apr. 24, 2019).
[17] *Id.*
[18] *Id.*
[19] World Nuclear Association, Storage and Disposal of Radioactive Waste (last updated October 2018), *available at* http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/storage-and-disposal-of-radioactive-wastes.aspx (last visited Apr. 24, 2019).
[20] *Id.*
[21] *Id.*
[22] The total estimate for DOE's environmental cleanup "may be underestimated because under federal accounting standards, environmental liability estimates do not include cost estimates for work for which reasonable estimates cannot currently be generated." U.S. Government Accountability Office, High Risk List, *available at* https://www.gao.gov/highrisk/overview (last visited on Apr. 18, 2019).

more than $110 billion, growing from $384 billion to $494 billion.[23] According to GAO, this was primarily due to an increase in the estimated cost of the cleanup at the Hanford Site in Washington State. However, as previously noted, these estimated costs may be understated because of federal accounting rules.[24]

The DOE and the U.S. Department of Defense (DOD) are responsible for the majority of the federal government's environmental liability and the remaining portions of the liability are shared among other agencies, including the Department of Transportation, the Department of Veterans Affairs, the Department of Interior, and the Department of Agriculture. In Fiscal Year (FY) 2017, the federal government's liability was $465 billion.[25] In FY 2017, DOE was responsible for about 83 percent of the liability—$384 billion—"related primarily to retrieving, treating, and disposing of nuclear and hazardous waste."[26] In FY 2017, DOD was responsible for about 15 percent of the liability—$68 billion—"related primarily to environmental cleanup and restoration activities at its installations."[27]

EM's environmental liability has grown annually and outpaced the agency's annual spending on cleanup activities. For example, between FY 2011 and FY 2017 EM's environmental liability grew almost $105 billion—from $163 billion to $268 billion.[28] Of the $105 billion, about $26 billion was due to inflationary adjustments in those years.[29] In that same period, EM spent approximately $40 billion.[30] The $40 billion was primarily spent "to address radioactive tank waste, including constructing Hanford's Waste Treatment and Immobilization Plant, as well as to treat and dispose of other nuclear and hazardous materials."[31] Similarly, in the past two fiscal years, the environmental liability grew by $122 billion, while DOE spent over $12 billion on cleanup activities.[32]

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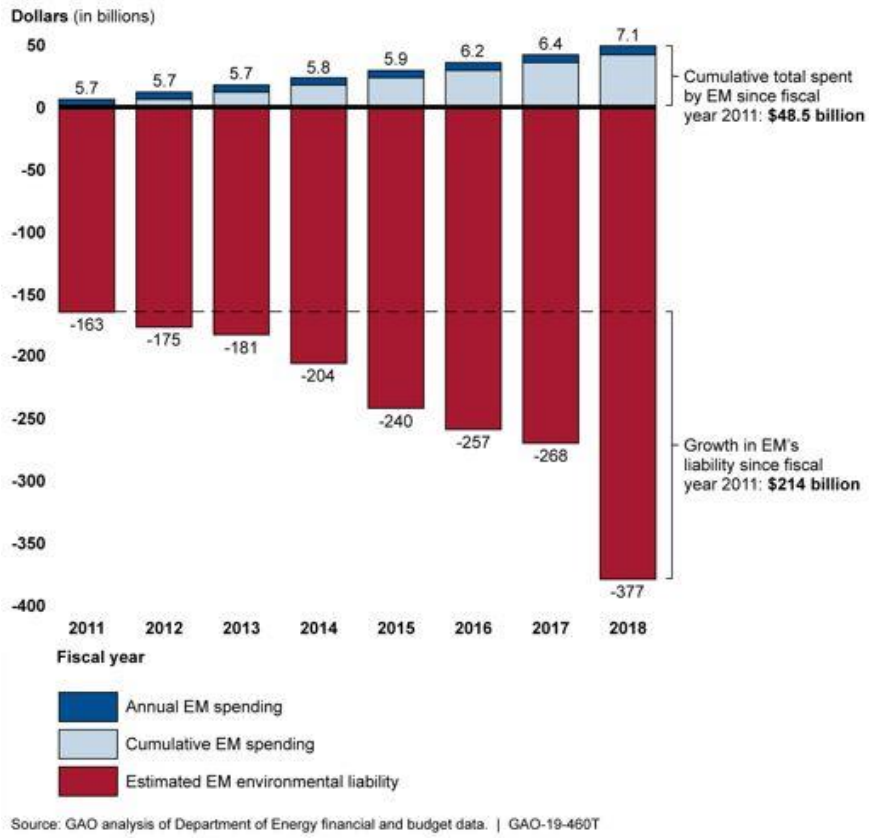
[23] U.S. Government Accountability Office, High Risk List, available at https://www.gao.gov/highrisk/overview (last visited on Apr. 18, 2019).
[24] *Id.*
[25] U.S. Government Accountability Office, High Risk, U.S. Government's Environmental Liability, Why It's High Risk, *available at* https://www.gao.gov/highrisk/us_government_environmental_liability/why_did_study#t=1 (last visited on April 24, 2019).
[26] *Id.*
[27] *Id.*
[28] U.S. Government Accountability Office, *Department of Energy: Program-Wide Strategy and Better Reporting Needed to Address Growing Environmental Cleanup Liability* 15 (Jan. 2019), *available at* https://www.gao.gov/assets/700/696632.pdf.
[29] *Id.*
[30] *Id.*
[31] *Id.*
[32] U.S. Government Accountability Office, *High-Risk Series: Substantial Efforts Needed to Achieve Greater Progress on High-Risk Areas* 140 (Mar. 2019), *available at* https://www.gao.gov/assets/700/697245.pdf.



Historically, EM was tasked with "cleaning up 107 sites across the country whose area is equal to the combined area of Rhode Island and Delaware."[33] To date, DOE has completed cleanup at 91 of its 107 sites,[34] with 16 sites remaining. Below is a list of the remaining sites, including location, projected lifecycle completion cost/schedule, and FY 2020 budget requests:[35]

Site Name	**Location**	**Projected Lifecycle Completion Cost/Schedule**	**Fiscal Year 2020 Budget Request**
Brookhaven National Laboratory	Upton, New York	$486 - $491 million / 2020	$0 million
Waste Isolation Pilot Plant (WIPP)	Carlsbad, New Mexico	$7.13 - $7.54 billion / 2033-2042	$398 million
Los Alamos National Laboratory	Los Alamos, New Mexico	$6.25 - $7.33 billion / 2036	$195 million

[33] Cleanup Sites, *Progress through Action*, Office of Environmental Management, U.S. Department of Energy, *available at* https://www.energy.gov/em/mission/cleanup-sites (last visited on Apr. 19, 2019).
[34] U.S. Department of Energy, List of Geographic Sites Completed by FY 2016, *available at* https://www.energy.gov/sites/prod/files/2016/03/f30/Geographic%20Sites%20completed_2016_Answer.pdf (last visited on Apr. 19, 2019).
[35] Cleanup Sites, *Progress through Action*, Office of Environmental Management, U.S. Department of Energy, *available at* https://www.energy.gov/em/mission/cleanup-sites (last visited on Apr. 19, 2019).

Energy Technology Engineering Center (ETEC)	Canoga Park, California	To be determined.	$18 million
Hanford Richland Operations Office Office of River Protection (ORP)	Richland, Washington	$56.80 - $64.54 billion / 2070-2075 $69.99 - $77.22 billion / 2070-2075	$718 million $1.392 billion
Idaho National Laboratory (INL)	Idaho Falls, Idaho	$18.73 - $21.43 billion / 2045-2060	$348 million
Lawrence Livermore National Laboratory (LLNL)	Tracy, California	$545 - $555 million / 2023	$130 million
Moab	Moab, Utah	$1.86 - $1.19 billion / 2034	$36 million
Nevada National Security Site (NNSS)	65 miles northwest of Las Vegas, Nevada	$2.66 billion / 2030	$61 million
Oak Ridge Reservation	Oak Ridge, Tennessee	$18.39 - $18.72 billion / 2046	$429 million
Paducah Gaseous Diffusion Plant	Paducah, Kentucky	$34.93 - $41.07 billion / 2065-2070	$277 million
Portsmouth Gaseous Diffusion Plant	Piketon, Ohio	$17.49 - $18.50 billion / 2039-2041	$426 million
Sandia National Laboratories	Outside of Albuquerque, New Mexico	$284 - $285 million / 2028	$3 million
Savannah River Site (SRS)	Aiken, South Carolina	$97.01 - $115.09 billion / 2065	$1.642 billion
Separations Process Research Unit (SPRU)	Niskayuna, New York	$233 million / 2021	$15 million
West Valley Demonstration Project (WVDP)	West Valley, New York	$1.87 - $2.05 billion / 2040-2045	$78 million

C. GAO's High Risk List and Environmental Liability Work

Every two years GAO issues a high risk list which contains a list of programs and operations that are deemed to be 'high risk' due to their vulnerabilities for fraud, waste, abuse, and mismanagement or that need transformation. In 2017, GAO added the federal government's environmental liability to its high risk list, and it remained on GAO's high risk list for 2019. In FY 1997 the federal government's estimated environmental liability was $212 billion, and in FY 2017, the estimated environmental liability was $465 billion.[36] The environmental liability number is expected to continue to grow.

[36] U.S. Government Accountability Office, High Risk, U.S. Government's Environmental Liability, Why It's High Risk, *available at* https://www.gao.gov/highrisk/us_government_environmental_liability/why_did_study#t=1 (last visited Apr. 24, 2019).

Given the federal government's growing environmental liability and GAO's high risk designation, then-Chairman Greg Walden, Vice Chairman Joe Barton, Energy Subcommittee Chairman Fred Upton, and Environment Subcommittee Chairman John Shimkus sent a letter on March 31, 2017 to GAO requesting that they evaluate the performance of EM's operational activities and the role of performance assessments in informing those activities.[37] GAO's report, including recommendations, was released in February.[38]

According to GAO's report, as the number of sites requiring cleanup decreases, the cleanup costs are increasing and the timetable for cleanups is delayed, further increasing cleanup costs. In addition, according to the GAO, DOE could not provide detailed reasons for why the estimated liabilities increased, including the $110 billion increase from FY 2017 to FY 2018, finding that DOE had not conducted a root cause analysis of the increase. Further, GAO found that EM does not follow program management leading practices or project management best practices. Finally, GAO found that DOE does not have a strategy on how to make the cleanup program more efficient and effective.

DOE and DOD have open recommendations that GAO believes, if implemented, would improve the quality of environmental liability estimates and begin to address the growing liability. The open recommendations for DOE are: 1) "develop a program-wide strategy that outlines how DOE will direct available resources to address human health and environmental risks across and within sites;" 2) include information on annual growth in environmental liability estimates by site and the causes of that growth in DOE-EM's Future Years Defense Environmental Management Plan, as well as explanation of significant differences between lifecycles cost estimates in DOE-EM's annual budget submission with the environmental liability estimates;" and 3) "disclose the funding needed to meet all of its enforceable cleanup milestones in, for example, supplemental reports or the annual Future-Years Defense Environmental Management Plan."[39] In addition to the aforementioned actions, GAO noted that DOE and DOD addressing open recommendations will be key to making progress in addressing this high-risk area.[40]

In addition to the open recommendations, GAO utilizes five criteria when evaluating whether to remove a program or operation from its high risk list: leadership commitment, capacity, action plan, monitoring, and demonstrated progress. According to GAO, since

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[37] Letter to Hon. Gene L. Dodaro, Comptroller General of the United States, U.S. Government Accountability office, from Hon. Greg Walden, Chairman, Comm. on Energy and Commerce, et. al. (Mar. 31, 2017), *available at* https://archives-energycommerce.house.gov/sites/republicans.energycommerce.house.gov/files/documents/114/letters/20170331GAO.pdf.

[38] U.S. Government Accountability Office, *Nuclear Waste Cleanup: DOE Could Improve Program and Project Management by Better Classifying Work and Following Leading Practices* (Feb. 2019), *available at* https://www.gao.gov/assets/700/696955.pdf.

[39] U.S. Government Accountability Office, High Risk, U.S. Government's Environmental Liability, What Remains To Be Done, *available at* https://www.gao.gov/highrisk/us_government_environmental_liability/why_did_study#t=2 (last visited Apr. 24, 2019).

[40] *Id.*

environmental liability was first added to the high risk list in 2017, DOE and DOD have partially met the leadership commitment criteria but have not met the other four criteria.

Lastly, GAO's 2019 High Risk Report noted that congressional action may be needed. Specifically, GAO recommended that "Congress should consider clarifying, in a manner that does not impair the regulatory authorities of EPA and the state of Washington and in consultation with the Nuclear Regulatory Commission, DOE's authority at Hanford to determine whether portions of the supplemental low activity waste can be managed as other high-level waste. Providing clear authority to DOE may allow it to use alternative waste treatment approaches to treat Hanford's supplemental low activity waste, which could reduce certain risks by neutralizing the waste faster and save tens of billions of dollars."[41]

D. Office of Environmental Management's Recent Actions

At a hearing on April 9, 2019 before the House Armed Services Committee's Subcommittee on Strategic Forces, Assistant Secretary for Environmental Management Anne White testified that "EM is committed to working in a collaborative manner with Congress and others toward a future that will not simply enable the cleanup program to continue – but will propel the mission forward and drive it toward completion and closure."[42] Her testimony further noted that EM will "focus on strengthening program management, oversight, and accountability to ensure value for the American taxpayer."[43] Specifically, her testimony stated that "EM is looking 10 years out at what the barriers are and how they could be mitigated for faster completion. We are developing site options analyses to identify opportunities to complete cleanup work through more efficient, innovative, or novel approaches over the next decade. This includes considering the range of possibilities in terms of what could be achieved at sites across the complex if we are willing to reassess our assumptions, consider new approaches and disposal options, and just think outside the box."[44] Some of the recent steps taken by EM involve evaluating their interpretation of the statutory term high-level radioactive waste, working to drive down the operating and maintenance costs for its facilities, and assessing new contracting models.

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[41] U.S. Government Accountability Office, *High-Risk Series: Substantial Efforts Needed to Achieve Greater Progress on High-Risk Areas* 141 (Mar. 2019), *available at* https://www.gao.gov/assets/700/697245.pdf.
[42] Testimony of Anne Marie White, Asst. Sec. for Environmental Management, U.S. Dept. of Energy, before the U.S. House Subcomm. on Strategic Forces, Comm. on Armed Services (April 9, 2019), *available at* https://docs.house.gov/meetings/AS/AS29/20190409/109269/HHRG-116-AS29-Wstate-WhiteA-20190409.pdf.
[43] *Id.*
[44] *Id.*